Symbolic calculation behind floating-point arithmetic using CAS

Włodzimierz Wojas[1], _Jan Krupa_[1]   [jan_krupa@sggw.pl]

[1] Department of Applied Mathematics, Warsaw University of Life Sciences (SGGW), Warsaw, Poland

In this talk we would like to present using CAS, some examples of symbolic calculations which lie behind calculations in floating-point arithmetic (with double precision). Each operation in floating-point arithmetic is performed according to a precise-symbolic algorithm. In spite of the fact that floating point arithmetic is based on symbolic operations, it gives approximate results with the exception of adding, subtracting, multiplying and dividing powers of two, adding, subtracting, and multiplying sums of powers of two, adding, subtracting and multiplying of integers. We will present in this talk the simple examples in Mathematica and wxMaxima that result of operations depends on the interpretation of the used input data (numbers) by CAS functions(such as Solve, Limit, Det, solve, limit, det) – as symbolic or approximate and on used by these CAS functions algorithms.

Keywords

Higher education,Floating Point Arithmetic, Application of CAS, Mathematica, Mathematical didactics

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